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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,243	10/22/2003	Arthur Sherman	ASMMC.9CP1DV1D	8398
20995 7590 09/19/2007 KNOBBE MARTENS OLSON & BEAR LLP 2040 MAIN STREET FOURTEENTH FLOOR IRVINE, CA 92614			EXAMINER TUROCY, DAVID P	
			ART UNIT 1762	PAPER NUMBER
			NOTIFICATION DATE 09/19/2007	DELIVERY MODE ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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# Office Action Summary

Application No.

10/692,243

Applicant(s)

SHERMAN, ARTHUR

Examiner

David Turocy

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 20 July 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>6/22/2007</u> | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/20/2007 has been entered.

### ***Response to Amendment***

2. Applicant's amendments, filed 7/20/2006, have been fully considered and reviewed by the examiner. The examiner notes the amendments to the independent claims 1 and 8 and claim 10. Claims 1-11 remain pending in the instant invention.

### ***Response to Arguments***

3. Applicant's arguments filed 7/20/2007 have been fully considered but they are not persuasive.

The examiner has argued against the combination of references stating that the prior art references disclose forming epitaxial layer of silicon and oxidizing and that once the first monolayer of oxide is formed, it would not possible to deposit another epitaxial layer of silicon. However, such a statement has not been supported by any factual evidence. Since the statement is mere conjecture the applicant's arguments must be

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considered mere attorney speculation not supported by evidence. *In re Scarborough*, 500 F.2d 560, 566 182 USPQ 298, 302 (CCPA 1974). Even in the event that such is the case, the examiner notes that a portion of the layer of Sandersen is silicon dioxide and therefore, the references would suggest depositing multiple layers of oxidize silicon is within the skill of those ordinary in the art.

The applicant has argued against the combination of Sandaresan in view of Bedair and Faraone, stating that Sandareson and Bedair disclose a method of depositing epitaxial silicon and therefore once the first monolayer of oxide is formed the subsequent cycles of epitaxial deposition cannot be achieved. However, while the examiner notes as discussed above that the arguments are not supported by any factual evidence. The examiner cites here Molsa as utilized in the prior office action, which discloses deposition using ALE to form thick layers of a cerium oxide layer. The process is substantially similar to that as taught by Bedair, except Molsa discloses using cerium as the ALE precursor, versus using silicon.

The applicants argue against Bedair, stating that the reference discloses using hydrogen radicals only for epitaxial deposition of semiconductor materials and that the teachings are limited to only that process. The examiner disagrees. Bedair discloses known and suitable method for deposition and the selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

All other arguments are deemed moot because they are directed to newly added limitations that were not present at the time of the final rejection and such are addressed in the rejections to follow.

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

5. Claims 1, 3, 4, and 6 are rejected under 35 U.S.C. 102(a) as being anticipated by Nakamura et al. (Atomic-Layer Deposition of SiO<sub>2</sub> by remote plasma CVD).

The examiner notes that the applicant has failed to provide a date for Nakamura article. The examiner cites READ of Hiroshima University, stating that Research Center for Integrated Systems was terminated in March 1996, which establishes Nakamura et al article as prima facie prior art under 102(a). Nakamura article is published under the Research Center for Integrated Systems.

Nakamura discloses a method for growing silicon dioxide films in a chamber by sequential vapor deposition using a plurality of cycles comprising the steps of removing gases from the chamber, exposing the substrate to a silicon source, exposing the part coated with the silicon source to plasma comprising atomic hydrogen (abstract).

Claim 3-4: Nakamura discloses dichlorosilane gas.

Claim 6: Nakamura discloses a radical generator.

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sandaresan (US 6,064,077) in view of Bedair (Atomic Layer Epitaxy Deposition Processes) and further in view of Faraone et al (US Patent 4604304)

These claims are rejected for the same reasons as set forth in the office action dated 2/20/2007 and for the reasons set forth in section 3 above.

8. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sandaresan (US 6,064,077) in view of Bedair (Atomic Layer Epitaxy Deposition Processes) and further in view of Molsa and Faraone et al (US Patent 4604304)

These claims are rejected for the same reasons as set forth in the office action dated 2/20/2007 and for the reasons set forth in section 3 above.

9. Claims 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura et al. (Atomic-Layer Deposition of SiO<sub>2</sub> by remote plasma CVD) in view of Morishita (New Substances for Atomic-Layer Deposition of Silicon Dioxide) and WO 93/24243.

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The examiner notes that the applicant has failed to provide a date for Nakamura article. The examiner cites READ of Hiroshima University, stating that Research Center for Integrated Systems was terminated in March 1996, which establishes Nakamura et al article as prima facie prior art under 102(a).

Nakamura discloses a method for growing silicon dioxide films in a chamber by sequential vapor deposition using a plurality of cycles comprising the steps of removing gases from the chamber, exposing the substrate to a silicon source, exposing the part coated with the silicon source to plasma comprising atomic oxygen (abstract) (see WO 93/24243 at page 14-15, which discloses a plasma of NO<sub>2</sub> gas includes oxygen atoms). The reference is silent to the silicon precursor comprising oxygen. However, Morishita teaches suitable precursors for use in a two-step ALD process (table 1, section 2). Additionally, WO 93/24243 discloses known and suitable silicon precursors for vapor deposition processes include those which comprise oxygen atoms (Page 13). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use these precursors in the process taught by Nakamura. Therefore one of ordinary skill in the art would have reasonable expected to successfully provide predictable results in the process of Nakamura by using the silicon source gases with oxygen as taught by Morishita. The prior art can be modified or combined to reject claims as prima facie obvious as long as there is a reasonable expectation of success.

*In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375.

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Claim 10: Nakamura discloses generating an atomic oxygen comprising plasma within a generator.

Claim 11: WO 93/24243 discloses that it is known and suitable in the art to generate oxygen plasma using an Rf coil and therefore it would have been obvious to one of ordinary skill in the art to have modified Nakamura in view of Morishita to use the Rf coil to generate the oxygen plasma with a reasonable expectation of successfully providing an oxygen plasma. The selection of something based on its known suitability for its intended use has been held to support a *prima facie* case of obviousness.

*Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

10. Claims 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bedair (Atomic Layer Epitaxy Deposition Processes) in view of Morishita (New Substances for Atomic-Layer Deposition of Silicon Dioxide), Molsa and Faraone et al (US Patent 4604304) and further in view of Nakamura

Bedair in view of Morishita, Molsa and Faraone teach all the limitations as discussed in the office action dated 2/20/2007. Morishita discloses using water as a precursor for forming SiO<sub>2</sub> and the references fail to disclose using atomic oxygen. However, Nakamura discloses that NO<sub>2</sub> plasma, which as discussed above comprises atomic oxygen has advantages over using H<sub>2</sub>O because water is ill advised for vacuum processes due to the moisture on the chamber walls. Therefore, taking the references collectively, it would have been obvious to one of ordinary skill in the art to have



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modified Bedair in view of Morishita, Molsa, and Faraone, to use the NO<sub>2</sub> plasma gas because by doing so one would reap the benefits of improved process control by reducing the moisture present on the chamber walls. The prior art can be modified or combined to reject claims as prima facie obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375.

### ***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The examiner cites READ of Hiroshima University, stating that Research Center for Integrated Systems was terminated in March 1996, which establishes Nakamura et al article as prima facie prior art under 102(a). US Patent 6464779 by Powell et al. discloses atomic oxygen and atomic hydrogen are known and suitable reactants for an ALD process (Column 4, lines 15-30).


12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Turocy whose telephone number is (571) 272-2940. The examiner can normally be reached on Monday-Friday 8:30-6:00, No 2nd Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David Turocy/  
Patent Examiner  
AU 1762



**TIMOTHY MEEKS**  
**SUPERVISORY PATENT EXAMINER**